

TALK

SOUND

FROM THE MAKERS OF "SCOTCH" BRAND MAGNETIC TAPE

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TIME EFFECTS IN ERASING MAGNETIC RECORDINGS

It is well known that the difficulty of erasing a magnetic recording is a function of the magnetic material used, depending upon the coercive force and more particularly the saturating field for the medium. It has also been observed that high frequencies are more easily erased than low frequencies. This is probably an effect of the geometry of the field at an erase head, since the field is strongest at the surface of the tape and the front surface magnetization is predominant in high frequency signals. It has also been shown that 1) the difficulty of erasure is affected by the bias current used in recording. However, it has apparently been tacitly assumed that there are no time dependent factors in the difficulty of erasure. This is a plausible assumption, since recorded signal levels and the magnetic properties of the tape do not change measurably with storage, but we have found that it is not true.

Generally a recorded signal becomes harder to erase after storage. A loud note, which can be easily erased immediately after recording, may become so much harder to erase after months of storage that two or three times as much erase current is required to obliterate it. In extreme cases it has been found that an ordinary erase head could not be excited sufficiently to get rid of the

signal altogether. In such cases an "external" erasure by a strong electromagnet (for example, the Goodell "Noise-eraser") completely eliminates the signal but it may return during biasing or other excitation during a subsequent recording.

This effect is not serious except for high quality recordings because the effect is very small. For example, after storage, an erase head may reduce a loud signal by perhaps 55 db., after which external erasure reduces it to a level at least 80 db. below its original level. The signal may then be "revived" to a level of perhaps 60 db. below the original level, which may leave it audible even if below the noise level. This would be a very severe case, with much less effect being observed in most instances. Such performance has never been described in the literature and there is no adequate theoretical explanation available.

Heat has the effect of speeding and accentuating this increase in permanency, so that a roll stored a few hours at 80° C. shows the

1) R. Herr, B. F. Murphey, and W. W. Wetzel, Some Distinctive Properties of Magnetic Recording Media, Journ. Soc. Mot. Pict. Eng., Vol. 52, p. 77, Jan. 1949

Magnetic Products Division



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same effects as a roll stored months at room temperature.

A recording which has aged and become semi-permanent may, however, be removed by demagnetization and storage in the demagnetized state. Elevated temperature of storage in the demagnetized condition accelerates the obliteration of the magnetic "memory".

While the fundamental reasons for this behavior need not be discussed here, it is worth noting that not all magnetic materials show the same effect. In particular "SCOTCH" SOUND Recording Tape #111 and film #115, #116, and #117 2) show the effect negligibly or not at all. This valuable property of these tapes thus makes them especially desirable for recordings which must be kept for long periods of time before re-use.

In the case of recordings already made and particularly those made on tapes of other magnetic materials, the following procedures may be of practical importance:

1. Store tapes in erased rather than recorded condition, when the recording is no longer needed.

2. A tape having a background signal which cannot be completely erased should be stored for a few days in the erased condition, preferably not in a cool place.

3. Store recorded rolls in a cool location (this is also advisable for long tape life and freedom from layer-to-layer signal transfer).

4. Switch to "SCOTCH" Sound Recording Tape #111, #115, #116, or #117.

2) #115, #116 and #117 "SCOTCH" Sound Recording Films are .005" safety base acetate coated with the same magnetic oxide as used on #111. They are available in 35 mm. x 1000' (#115) 16 mm. x 400' (#116) and 17½ mm. x 1000 (#117) rolls, for use in synchronization with movie cameras.